
A study on the interactions between heparan sulfate proteoglycans and Wnt proteins.

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Public Summary:

Wnt signals are important for stem cells and plays key roles in development and adult homeostasis. Wnt proteins are secreted signals and lipid-modified. They can form gradients that are regulated at the level of protein secretion, diffusion, and internalization. These gradients can only exist if the hydrophobic Wnt proteins are prevented from aggregating in the extracellular environment. Long molecules of the heparan sulfate proteoglycan family are necessary for proper activity of Wnt proteins and influence their distribution along the morphogenetic gradient. We found show that heparan sulfate proteoglycan are able to maintain the solubility of Wnt proteins, thus stabilizing their signaling activity. Our results suggest that the role of HSPGs is not only to concentrate Wnt molecules at the cell surface but also to prevent them from aggregating in the extracellular environment.

Scientific Abstract:

The Wnt signaling pathway plays key roles in development and adult homeostasis. Wnt proteins are secreted, lipid-modified glycoproteins. They can form morphogen gradients that are regulated at the level of protein secretion, diffusion, and internalization. These gradients can only exist if the hydrophobic Wnt proteins are prevented from aggregating in the extracellular environment. Heparan sulfate proteoglycans (HSPGs) are necessary for proper activity of Wnt proteins and influence their distribution along the morphogenetic gradient. In this study, we show that HSPGs are able to maintain the solubility of Wnt proteins, thus stabilizing their signaling activity. Our results suggest that the role of HSPGs is not only to concentrate Wnt molecules at the cell surface but also to prevent them from aggregating in the extracellular environment.

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